

AMENDMENTS TO THE DRAWINGS

The attached sheet of drawings includes changes to Figure 1, which is amended to include a legend of PRIOR ART.

Attachment: Replacement Sheet

REMARKS

Applicant wishes to thank the Examiner for the attention accorded to the instant application, and respectfully requests reconsideration of the application as amended.

Formal Matters

Claims 2-17 are pending in the application. Claims 2, 4, 5, 10, 11 and 17 are amended. Claim 1 is canceled. Specifically, claim 2 is amended to include the feature “only spread codes orthogonal to the spread codes of the jth (j is an integer of 1 or more and M or less, $i \neq j$) transmission antenna corresponding to the correlation value” from claim 1, which is canceled. Claims 2 and 10 are amended to more clearly recite that they are method claims. Claims 4, 5, 11 and 17 are amended to correct minor errors. Care has been taken to ensure no new matter is being entered.

Applicant thanks the Examiner for acknowledgement of review of the references in the Information Disclosure Statement filed March 15, 2006.

Priority

The Examiner states that if applicant desires to claim the benefit of a prior-filed application, a specific reference must be included in the specification. Applicant responds that this application is a national stage filing of a PCT application, filed under 35 U.S.C. § 371. Applicant's filing included transmittal form PTO-1390, and applicant has received Form PCT/DO/EO/903 from the USPTO indicating acceptance of the application as a national stage submission under 35 U.S.C. § 371. Applicant does not wish to make any additional claim of priority.

Drawings

The Examiner requests that Figure 1 be designated by a legend such as PRIOR ART.

Applicant herein submits a replacement sheet of Figure 1 with this legend. No new matter is added.

Specification

The Examiner objects to the disclosure because of informalities. In accordance with the Examiner's request, applicant submits herewith amendments to the specification and an amended abstract. This amended abstract removes referral numbers in accordance with the Examiner's request. Minor corrections to the abstract's text are also made. No new matter has been added. Applicant respectfully requests that this abstract replace the earlier filed one, and that this objection be withdrawn.

Claim Objections

The Examiner objects to claims 2 and 3 because of informalities. The Examiner asserts that claims 2 and 3 are a substantial duplicate of claim 1. Accordingly, applicant cancels claim 1. Claim 4 is objected to because of informalities. Applicant amends claim 4 in accordance with the Examiner's suggestion. Claims 11 and 17 are objected to because of informalities. Applicant amends claims 11 and 17 in accordance with the Examiner's suggestion. Withdrawal of this objection is respectfully requested.

Rejection of Claims Under 35 U.S.C. §101

Claims 4-9 are rejected under 35 U.S.C. § 101 because the claimed invention is directed to non-statutory subject matter. The Examiner asserts that these claims are directed to an abstract idea without producing a useful, concrete and tangible result. Applicant respectfully traverses this rejection. Claims 4-9 all depend from claim 2, each dependent claim incorporating all of the

features and limitations of its base claim. Hence, claims 4-9 are directed to the statutory subject matter of claim 2, that is, statutory subject matter of a method tied to a particular machine or apparatus. (See *In re Bilski*, 545 F.3d 943, 88 USPQ2d 1385 (Fed. Cir. 2008), and USPTO Memorandum RE: Guidance for Examining Process Claims in view of *In re Bilski*, January 7, 2009). Specifically, claim 2 recites a spread code assigning method tied to a code spread radio communication system that is a particular apparatus including radio transmission devices and antennas. Thus claims 4-9 are not directed merely to an abstract idea. Withdrawal of this rejection is respectfully requested.

Rejection of Claims Under 35 U.S.C. §112

Claims 1, 2 and 10 are rejected under 35 U.S.C. § 112, second paragraph, as unclear because the claims recite the limitation “a spread code assigning method” but are stated as being “in a code spread radio communication system”. Claim 1 is canceled, rendering its rejection moot. Claims 2 and 10 are amended to recite that the spread code assigning method is FOR USE IN a code spread radio communication system. Thus the claims recite and claim a method for assigning spread codes. Withdrawal of this rejection is respectfully requested.

Rejection of Claims Under 35 U.S.C. §102

Claims 1-4 and 13-15 are rejected under 35 U.S.C. § 102(e) as anticipated by Kuwahara et al., U.S. Patent No. 6,804,216 (hereinafter “Kuwahara”). This rejection should be withdrawn based on the comments and remarks herein.

Among the problems recognized by the present invention is that when the same spread code is used for different propagation paths in a code spread radio communication system, the

information mutually interferes between the propagation paths, resulting in deterioration of reception characteristic. The present invention solves this problem by dynamically assigning spread codes to each propagation path corresponding to the correlation between propagation paths. The inventive method is applied to a Multiple-Input Multiple-Output (MIMO) system in which one radio transmission device, such as a base station, transmits two or more transmission sequences, e.g., signal sequences, with two or more antennas. The inventive method assigns spread codes having small cross correlation value, e.g., low orthogonality, to spread codes of the transmission antenna corresponding to the correlation value when the transmission antenna has a propagation path of a correlation value exceeding a predetermined threshold value. Further, for a transmission antenna having no propagation path of a correlation value exceeding the threshold value, spread codes are assigned without considering orthogonality to spread codes in the other transmission antennas.

In Kuwahara, one base station transmits only one transmission sequence and spread codes to be assigned to the base station are decided in consideration of a time-space correlation in a receiving end. Kuwahara teaches a technique for spread code reassignment which is triggered by “a condition that each of a code correlation and a propagation path correlation deviates from an optimum state due to a change in signal propagation caused by movement of a mobile terminal” (column 11, lines 61-65). The spread code reassignment is carried out in accordance with a check made to find out a combination of codes in which the space correlation and the propagation paths is minimized (column 12, lines 18-23). For channels having a high degree of space correlation for example, spread codes using the same long code are assigned (column 12, line 66 to column 13, line 2). Kuwahara does not teach or suggest assigning spread codes orthogonal to the spread codes of the j th transmission antenna corresponding to the correlation

value, or spread codes having a small cross correlation value to spread codes of the jth transmission antenna corresponding to the correlation value, and also assigning spread codes without considering orthogonality to spread codes in the other transmission antennas, as recited in independent claims 2 and 13.

It has been held by the courts that “Anticipation requires the presence in a single prior art reference disclosure of each and every element of the claimed invention, arranged as in the claim.” *Lindemann Maschinenfabrik GMBH v. American Hoist and Derrick Company et al.*, 730 F.2d 1452, 221 USPQ 481 (Fed. Cir. 1984). As illustrated above, Kuwahara does not disclose assigning spread codes in accordance with a propagation path, so that Kuwahara does not disclose every feature of the invention as recited in independent claims 2 and 13. Consequently, these independent claims are not anticipated by the art of record in the application. Claims 3 and 4 depend from claim 2, and claims 14 and 15 depend from claim 13, each dependent claim incorporating all of the features and limitations of its base claim. Hence, these dependent claims are not anticipated by the art of record for at least the reasons that their base claims are not anticipated by the art of record. Accordingly, this rejection should be withdrawn.

Rejection of Claims Under 35 U.S.C. §102

Claims 10 and 11 are rejected under 35 U.S.C. § 102(e) as anticipated by Sudo, U.S. Patent No. 7,298,722. This rejection should be withdrawn based on the comments and remarks herein.

The present invention as recited in independent claim 10 is also based on MIMO in which one radio transmission device, e.g., base station, transmits two or more transmission sequences, e.g., signal sequences, with two or more antennas. The present invention recites, in claim 10, a

spread code assigning method that reduces, when a detected reception quality is below an object minimum value, a maximum value of the number of the spread codes assigned to the transmission antenna corresponding to the reception quality, and increases, when the detected reception quality exceeds an object maximum value, the maximum value of the number of spread codes assigned to the transmission antenna corresponding to the reception quality.

In Sudo, columns 25 and 26, one base station transmits only one transmission sequence and a signal level of spread codes to be assigned to the base station is decided in consideration of a reception characteristic in a receiving end. Sudo discloses the signal level of subcarriers with a low degree of signal multiplexing and/or with a high degree of signal multiplexing is changed adaptively (column 26, lines 17-24). Sudo does not teach or suggest changing the maximum value of the spread codes assigned to the transmission antenna, as recited in independent claim 10. Thus, Sudo does not teach each feature of the present invention as recited in claim 10, so that this independent claim, along with its dependent claim 11, are not anticipated by Sudo.

Accordingly, this rejection should be withdrawn.

Rejection of Claims Under 35 U.S.C. §103

Claim 5 is rejected under 35 U.S.C. § 103(a) as unpatentable over Kuwahara in view of Aoki et al., U.S. Patent Application Publication No. 2004/0028157 (hereinafter “Aoki”). Claim 6 is rejected under 35 U.S.C. § 103(a) as unpatentable over Kuwahara in view of Sudo. Claim 7 is rejected under 35 U.S.C. § 103(a) as unpatentable over Kuwahara in view of Aoki, and further in view of Sudo. Claim 8 is rejected under 35 U.S.C. § 103(a) as unpatentable over Kuwahara in view of Goto, U.S. Patent Publication No. 2002/0037030. Claim 9 is rejected under 35 U.S.C. § 103(a) as unpatentable over Kuwahara in view of Aoki and further in view of Goto. Claims 12,

16 and 17 are rejected under 35 U.S.C. § 103(a) as unpatentable over Sudo in view of Kuwahara. These rejections should be withdrawn based on the comments and remarks herein.

As discussed above, Kuwahara does not disclose assigning spread codes in accordance with a propagation path, as recited in independent claim 2. None of the additional art cited by the Examiner overcomes this deficiency, and the Examiner does not suggest otherwise.

It has been held by the courts that to establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. See, *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). As illustrated above, the hypothetical combination of Kuwahara, Sudo, Aoki, and Goto, taken singly or in any combination, does not disclose or suggest assigning spread codes in accordance with propagation paths as recited in independent claim 2, and does not teach or suggest each and every feature of the present invention as recited in this independent claim. Thus *prima facie* obviousness has not been established, so that this independent claim, and its dependent claims 5-9 and 12, patentably distinguish over the art of record in the application.

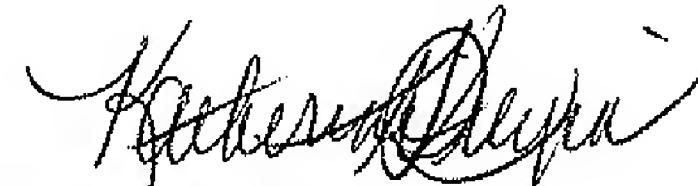
Further, as discussed above, Sudo does not disclose changing the maximum value of the spread codes assigned to the transmission antenna, as recited in independent claim 10. This feature is also recited in independent claim 16, so that Sudo does not teach each feature of claim 16. Kuwahara does not overcome this deficiency and the Examiner does not state otherwise. Thus *prima facie* obviousness has not been established, so that independent claim 16, and its dependent claim 17, patentably distinguish over the art of record in the application.

Accordingly, withdrawal of these rejections is respectfully requested.

Conclusion

For at least the reasons set forth in the foregoing discussion, Applicant believes that the Application is now allowable, and respectfully requests that the Examiner reconsider the rejection and allow the Application. Should the Examiner have any questions regarding this Amendment, or regarding the Application generally, the Examiner is invited to telephone the undersigned attorney.

Respectfully submitted,



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